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manifested. They did not always appear in the form of a bow, and once I saw them lie like a beautiful veil along the whole length of Rainbow Hill on the upper Nascaupee. There was a wonderful clearness in the atmosphere, which made landmarks miles away seem very near and clothed the far-distant hills with colour indescribably beautiful. In the blue of the hills and the waters and the sky there was a peculiar silveriness, which, with the white of the reindeer moss and the dark green of the spruce forests, touched in places with tender green of the white birch and poplar, made a combination of colour which I think can scarcely be surpassed in beauty anywhere in the world. In a way which I could neither describe nor understand, it was comforting.

The flies and mosquitoes, for which the country is famed, did not wholly fail of accomplishing their dire designs upon us; but their ravages are easily forgotten in the remembrance of the beauties of that lone land which can smile with so much grace, even though its mood has sometimes been one of such persistent cruelty.

IMPRESSIONS OF A NATURALIST IN BRITISH GUIANA.

BY

PROF. ANGELO HEILPRIN.

When in 1825 Charles Waterton published his delightful "Wanderings in South America" he gave to the world the first picture of what Anthony Trollope has called the "true and actual Utopia of the Caribbean Seas, namely, British Guiana." In it we have presented one of the most fascinating introductions to a region of charm and beauty—an impression of nature which is scintillant with the glories of the field and forest, that mocks, however rudely, the labour of the systematist and cabinet, that invites to hidden secrets in a largely unknown world. The "Wanderings in South America" has doubtless been to many one of the earliest books of travel to inspire, and it has always seemed to me to be the impelling force which through many years has held up the vision of a journey to the great primeval forest of the south. Therefore, to its author *nominatim* I surrender "a certain portion of the honours" that may come to me from my recent and exceedingly modest journey; for, as he says, "As Ulysses sent Achilles to Troy, so I sent him to Guiana."

If Surinam, the close neighbour and parent of British Guiana, can be properly likened, as has been done by Palgrave, to the Biblical paradise simply because it is "a very pleasant place" and not over-progressive, so, for like reasons, the comparison might be extended to cover the British colony, in which the moulding of man and his methods sees before it a long future. The similarity, if it does not extend much beyond the two conditions which it specifies, has other elements that may be thought to justify a comparison. A free, untrammelled Nature tends toward *paradisism*, and there are few regions of the earth's surface where the encroaches of man have done less to modify wild nature, or to take from it its majestic solemnity and grandeur, than the wilds that stretch in one almost unbroken sweep from the mouth of the Orinoco to the lower basin of the Amazon. It is here that the great primeval forest, the almost pathless solitude that has made classic the descriptive writings of Humboldt, Von Martius, Schomburgk, Bates, and Wallace, still gathers in its darkness from a region of almost no trespass, and unfolds itself in a magnificence that is perhaps not to be matched elsewhere. The continuous forest of the Amazon-Orinoco basin covers not less than 2,000,000 square miles; and, it may be, considerably more, and in its region of vast trackless woods there is hardly a gateway to the interior, barely a road or path, and virtually no line of travel-communication except where nature has set those water-highways which, even as secondary rivers, pour out their waters in volumes exceeding those of the Volga, the Danube, the Rhine, or even the Mississippi.

Most travellers receive their first impressions of British Guiana on their arrival at the capital city, Georgetown (more commonly designated from the country in which it is situated, Demerara), but before this, and for many miles out to sea, he will have noted a characteristic of the land in the yellow-brown waters that lie outside, the sediment that rolls out in floods or is gathered in from the discharge waters of the Orinoco. The Amazon seems to have little part in this discoloration; for, if my information is correct, much of the off-shore of French Guiana and the land lying still farther to the eastward are bathed by a clear sea. Back of the fringe of muddy water the eye follows the low contour of a bordering grove of mangrove, and beyond it in some places, or replacing it elsewhere, the glass may resolve a somewhat loftier growth of willow-like bushes, or even trees, the courida (*Avicennia nitida*). In the distance, less lofty than the occasional chimney that tells where the sugar-cane is being grown, or where it was

cultivated until competition with the sugar-beet broke the back of the most important, albeit steadily failing, industry of the colony, are a few specimens of the royal and cabbage palms (*Oreodoxa regia*, *Oreodoxa oleracea*), and the landscape is virtually complete. There is not a rise in the land that even remotely suggests a hill, and it is in faith only that the mind constructs the landscape of lofty mountains in the far interior. Nearing the land, a space of some three-quarters of a mile between the growths on either side invites to where the Demerara River opens out to sea, and on the river, a short distance up the right bank, lies Georgetown.

The capital city does not particularly concern the naturalist, except for its botanic garden and experiment station, its charming avenues of trees, and the open water-ways, the so-called "canals" of the city, which are magnificently grown with the *Victoria regia* and the equally beautiful large-flowered water-lily and lotus. I had heard much of these open canals, but rarely a word regarding their attractiveness. Residents of the city are habituated to this display of floral wealth, but to the newcomer, to the one who knows these glories of vegetation only from the isolated specimens in botanic gardens, the spectacle is a ravishing one, however closely it may be associated with the prosaic topic of city drainage.

From the moment that the traveller has set foot on Georgetown soil he has made friends with that lovable and seemingly always cheerful laniine bird, the kiskadee (*Pitangus violaceus*). *Qu'est-ce-que-dit?* comes from the tree-tops overhead, from orchards and gardens, and from your hotel window-sill. Throughout all the hours of day and through many of the hours of semi-day this sprightly interlocutor plies his little inquiry, not waiting nor caring for a reply. In that part of town which insensibly removes to country, a more direct call upon the stranger may be made in the quizzical and surprisingly human "Who-are-you? Who-who-are-you?" of the native whippoorwill—a voice which, when once recognized, brings back pleasant memories of lands far away.

Georgetown is by no means a featureless city, and those who assume that decaying colonies must necessarily have their representation in centres ranking equally with them in decay will regard with more than respect the stately Government Buildings, the Law Courts, the market-house, the Club, the numerous large commercial houses—where, repeating a characteristic of many business-houses the world over, everything may be had from a needle to a church-steeple—and, above all, the inviting tropical houses that lie back in cool and shaded gardens. An effective system of trolley-cars

ministers to the wants of a very large part of the 60,000 inhabitants, by far the greater number of whom are blacks, and a smaller number East Indian coolies. The whites, who constitute about three-fourths of the entire white population of the colony, number less than six thousand. Georgetown is in outer dress more attractive than either Bridgetown, in Barbados, or Port-of-Spain, Trinidad, although from the peculiarities of its geographical location it can lay no claim to scenery as part of its composition. Although my visit was timed for the months of March and April, and therefore to the period when the sun was in one of its summer positions and virtually overhead, the highest shade temperature that I saw recorded was only 87.5°, between midday and 2 o'clock in the afternoon. At this distance, therefore, of only little more than four hundred miles from the equator the extreme temperature was below that which I had observed on the Yukon River, on or near the Arctic Circle. The evenings were invariably delightful, and their refreshing quality made man a willing servant to work on the morrow.

THE EXUBERANCE OF ANIMAL LIFE.

In the low savannah country that for miles extends backwards from the sea-border, and frequently assumes the garb of flooded meadows in which houses appear like floating arks and where man displays his amphibious instincts in a way to remind one that roadways are not always the determinants of direction in travel, the naturalist is brought face to face with that exuberance in animal life which is the day-dream of tropical nature. Hundreds and thousands of the white ibis fleck the meadows with their slender forms. With them are spoonbills, herons, and bitterns, and myriads of the little reed-bird (*Xanthosomus icterocephalus*)—the whole a bird paradise. The graceful little spur-wing or jacana (*Parra jacana*) is everywhere busy in the grass-copings and sedges, apparently unmindful of the watching eyes of hawks and harriers, which appear to be in every bush and tree. They plume themselves along the driveways, or sit gravely on branch or fence-post, taking no notice of the passer-by, no more than the passer-by takes notice of them. This quality of unconcern is charming in its relation to association, and gives an opportunity to the observer to make his investigations at close range. A large-sized manatee was disporting in a pool immediately back of the railroad station at Belfield, where we were waiting for a passing train, and it, too, seemed to be wholly indifferent to the people who happened to be near-by.

The abundance in which the birds were about naturally made one eager for the chance to see the rarer types. While speeding over the savannahs my eye caught sight of three individuals of the great American adjutant or jabirú (*Mycteria Americana*), "negro-kops" as they are here styled, so peacefully meditating that one might have thought them posed by a photographer. The naked branches of the lofty ceiba or silk-cotton tree everywhere hang with the purse-nests of the *Icterinæ*, twenty to fifty, or more, in number, all gently swaying in the breeze that catches their lofty position. Some of these nests, notably of the bunya-birds (*Ostินops decumanus*, *O. viridis*) measure at times five feet or more in length, and are marvels in delicacy of construction. Storm and rain may come, but the little ones still swing in placid security in their dizzy heights above. The thinking naturalist, despite all theories of birds' nests, must continue to ponder over the evolutionary process that shaped the destinies of these remarkable constructions.

At Buxton, a small hamlet a few miles from Georgetown, where I was for some days serving a most pleasant guestship, there was nailed over the passageway between the verandah and the interior sitting-room of my host's house the skin of a large water-kamudi or anaconda. It measured 20 feet 7 inches in length, and opened out to something more than two feet. It was thus a large animal, and I naturally assumed that it was a trophy obtained from the chase in some deep interior part of the colony. But my host informed me that it met its fate as a transgressor at a distance of only 150 yards from the house, and that hardly more than a twelve-month ago. The largest authenticated specimen of the anaconda coming from the colony appears to have measured about 29 feet in length.

On my first walk out from my host's house, a late afternoon family stroll, we chanced upon a specimen of the crab-dog (*Procyon cancrivorus*), which was being pursued in true raccoon-hunt fashion by a horde of negro boys and scatterlings. Poor creature, its broken back did not permit it to make either a vigorous defence or a graceful flight. On the morning following a living specimen of the crab-fox (*Canis cancrivorus*), its feet securely tied together, was deposited "on sale" on the porch steps. These instances of close neighbourhood will show how delightfully situated the zoölogist may be who chances to visit this region. He will not lack for material, although it can well be that at times this material may be found too close at hand. Returning early of an evening from a tennis-party, driving homeward, we found the road momentarily

blocked by a not entirely ignoble specimen of alligator, whose domain extended to the waters of a bordering canal. It was one of numerous denizens of the water-ways of the region; but of such the inhabitants take little count, and allow them to work out their own salvation. The alligator, as distinguished from the less common cayman, rarely attains a length, as I understand, much exceeding seven or eight feet.

THE MIGHTY RIVERS.

Lest the geographer become too thoroughly impressed with the notion that the great rivers of the globe are only those that serve as trade-carriers or have played a familiar part in childhood's study of geography, it may be noted that in this distant forest-land are rolling waters that would shame the rivers of Europe—that would put to a long test even the "Father of American Waters." The great sweep of the Corentyn and Essequibo, rivers that 60 miles or more above their estuarine mouths measure from three to four miles in width, and which for yet a further hundred miles may still carry two miles, is an object-lesson in geography which impresses with more than ordinary force. Let the traveller stand at Bartica on the Essequibo, where the waters of the Mazaruni and Cuyuni are mingled in with those of his own stream, and he will no longer wonder why this region is sometimes called in one of its Indian tongues "the land of many waters." From far off, like unto the picture which the master of "*Thanatopsis*" has given of the Oregon, roll in the waters of these mighty tributaries, threading the mazes of the dark forest that falls to their banks, and leaping in silver sheets of foam through the scarred rocks that here and there interpose as cataract-walls. Nearly all of the major streams of British Guiana are now freely and regularly navigated by small steamboats and launches, but obstructing cataracts do not in most cases permit of continuous navigation for more than 70-125 miles. Above the reach of tumbling waters, nearly all of which are passed downward by paddle-craft, middle-course navigation has been established in some cases, so that without difficulty the traveller may penetrate a far way into the interior. The Corentyn, Berbice, Demerara, Essequibo (with some of its major tributaries), and Barima have all their little passenger craft, and they afford an entrancing way of studying scenery and the general characteristics of the country.

My own main journey was made by way of the Demerara River to Wismar, thence by rail across a line of inner sand-dunes—the an-

cient sea-beach, still attested by the presence of shells which are identical with those found on the ocean front—largely overgrown with the trumpet-tree (*Cecropia peltata*), to Rockstone on the Essequibo, and from Rockstone (which lies a short distance above the head of a long line of rapids) to within a few miles of the Potaro River. The Demerara, in its course of about 70 miles to Wismar, presents scenery of only a mild type, but a veritable moving picture of life. The vegetation that borders it is rankly tropical, but what there is of woodland or forest is probably wholly of second growth. Great thickets of canna, of the giant-leaved "muck-a-muck" (*Montrichardia arborescens*), and cane grow out of the river's banks, and with other plants form so dense a fringe to the water that a land-surface is rarely to be seen, not even to a stray rock or pebble. The tier of thicket that rises back of the river-fringe is a vast conglomeration of green, in which the eye notes here and there clumps of eta (*Mauritia flexuosa*) and suwarri palm, of the more graceful cucurrit and manicole, the grey-barked and nearly naked-branched ceiba, with its swinging nests of cassiques, the lofty (*Mora excelsa*) purple-heart, and a mass of other trees all roped and matted together, and densely shrouded in upper growths of aroids, bromelias, and orchids. Tiny hamlets, some of them only visible in a few scattered houses, in a detached church, or in a country-store bearing the name of Chinese proprietorship, here and there peer out from the canopy of vegetation, or give evidences of existence in growths of bananas and cocoanut. But at all the "landings," which with few exceptions are made moving in mid-stream, in the manner of landings on the Rhine, you have plenty of folk—men, women, and children, mostly black or brown—come out to meet you, to gather in what is desired for debarkation at their "ports," or to take passage for some farther point on the river. At such meetings a generous flow of language usually acts as a stimulant to what intercourse is provided. The number of native boats that ply on the river is very large, and at nearly all times some of these—whether the simple dug-out or pirogue ("corial") or the banana-leaf sheltered scow and flat-boat—can be picked up along either shore. They transport fruit, dyewoods, baskets, wooden-ware and charcoal, some coming from far inland, others from the tributary waters that discharge under forest archways, so thickly screened by hanging and climbing plants as to be all but lost to the unaccustomed eye.

Throughout nearly the whole of the river-journey individuals of a species of fork-tailed swallow (*Atticora melanoleuca*) would

take refuge in a locker under the roof of the steamboat's deck. They came in twos and threes, would stop for a while and then be off again, wholly unmindful of the presence of man. Beyond these creatures there was little of animal life to be seen. Some bitterns and a few steel-blue kingfishers would at times flit across the water, and occasional stray parrots, easily recognized by the rapid, short movement of the wings and their flight in twos, might be observed gambolling among the loftier tree-crowns; but in general it was a quiet nature that prevailed, and there was little to suggest a struggle for existence.

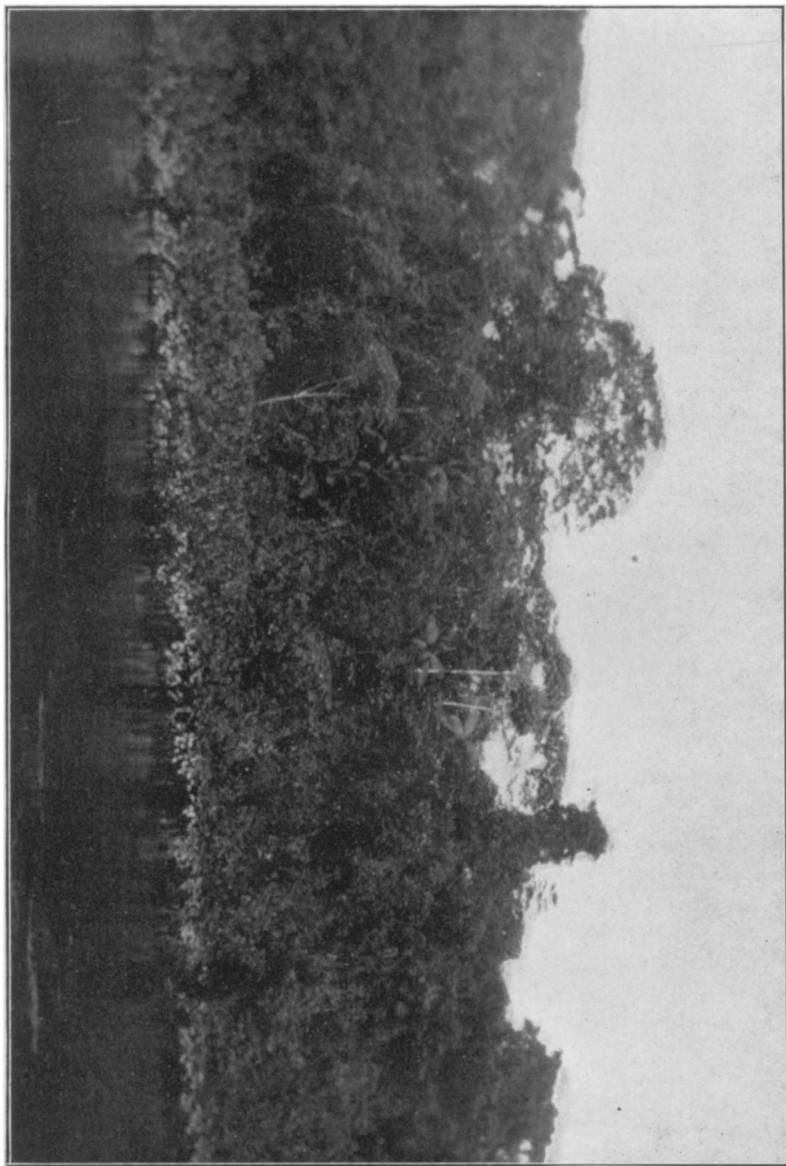
THE FOREST PRIMEVAL OF THE ESEQUEIBO.

Just beyond Rockstone, where a line of stately eucalyptus trees leads up to a modest but well-kept hostelry or bungalow built on the edge of the woods, the Essequibo opens out into a superb expanse, with the lofty forest primeval breaking down in curtained walls quite to the river's brink. It is here, where civilization is left behind, that one learns to appreciate what wealth of tropical vegetation really signifies, and how meek and lowly, even if lovingly beautiful, is the vegetation that in the north we ordinarily conceive of as being luxuriant. Little wonder that the botanist Richard Schomburgk wrote in raptured ecstasy his description of this wonderland, that his eyes felt continuously hungry for new marvels of forest creation. Fifty years and more have elapsed since the journey of this naturalist was undertaken, but the wilds of British Guiana, save for the tiny steam craft that move up and down the rivers, puffing out their long lines of smoke, and for a few gold-holes and a few clearings made around gold-prospects, remain the same as they were in the forties—untraversed by paths, uncut, and forbidding, as they will still continue to remain for many years in the future. The sweep of water extends out from one to one and a half miles in width, here and there enclosing islands large and small, but everywhere with virtually unbroken walls of vegetation to mark its limiting borders. There are no longer hamlets or houses, no more clearings or cultivated patches; hardly a boat glides upon the placid surface of the dark waters. The majesty of nature is held up in its half-silent wilderness, in the sea of green that in towering masses teaches a lesson of humility—that tells the inconsequence of man. For a journey of upwards of seventy miles we saw no break in the forest, save where tributary waters come to join the parent stream, parting the wilds now on one side, then on the other.

He is, indeed, a fortunate traveller who can make clear to him-

Phot. A. Heilprin.

FIG. 1.—THE PRIMEVAL FOREST OF THE ESEQUIBO RIVER.



self the components of this forest vegetation. We recognize the uplifted crowns of the mora, of the purple-heart and greenheart, here and there the feathery tufts of different palms, occasional fronds of giant tree-ferns, or the buttressed trunks of the ceiba; but what are these to the vast assemblage of forms that are a secret to all but the professional botanist or that have yet to receive a name? The eye follows wonderingly the long lines of swinging and festooned lianas or bush-ropes, searches the rugged and scarring growths of air-plants that shroud the upper tree-trunks, and then falls upon that wonderful outer tunic, the curtain of creepers, that overgrows all, and, hanging terrace-like from crown to root, keeps to itself the mystery of the interior.

The wall of vegetation maintains a generally uniform height of 125 to 150 feet, with projecting crowns occasionally rising 20-30 feet higher. It is this great height, so difficult at first to realize, which makes the solemn grandeur of the equatorial woodland. The eye fatigues in following the tree-trunks to their lofty terminations, and where it has been finally set at rest it only half sees through the intricacies of foliage that bound its path. The forest, although very densely matted on the absolute water-margin—so much so as to make a footing almost impossible in many parts—is not strictly impenetrable even in the ordinary descriptive sense; for, once away from the water, the barrier of creepers largely disappears, and the undergrowth progressively thins out. But it is only at rare intervals that the machete or cutlass can be dispensed with.

Although the general colour effect of the outer wall of the forest is that of an intense green, there are, nevertheless, many interchanges of brown, russet, and silvery grey—the expression of seasonal change, more or less corresponding to the autumnal changes in our own vegetation, in the foliage of certain groups of plants, I believe for the most part *Leguminosae*; but there were few trees or bushes that were destitute of leaf-covering—a marked contrast to the “winter” vegetation which I had before observed on the plains of Yucatan, or to that which I found in the middle of April on the slopes of the outer Andes between La Guaira and Caracas. I was surprised to find here and elsewhere in the forest so few fallen monarchs and generally decaying timbers—a striking contrast to the picture of our own north woods. What became of the trees that had passed their years was not always apparent, but the silent, destructive work of the little termite tells at least a

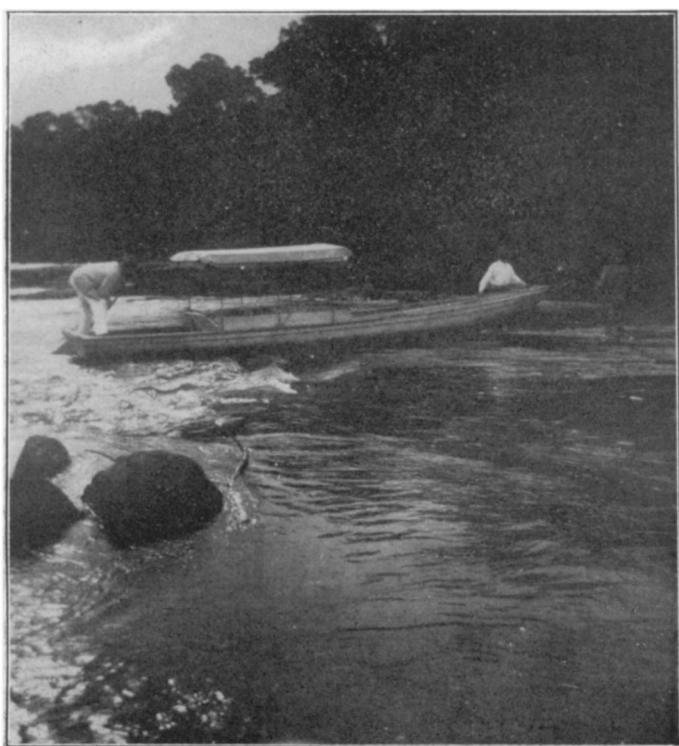
part of the story. They grind down to powder, and stand as messengers to assimilate the living with the dead.

The average student or reader is apt to picture the tropical wilderness with an aspect wholly different from that of the forest of deciduous trees of the North. Strange forms in foliage are calculated to impress the mind in a particular way, and to give a distinctness to contour which is largely or wholly wanting elsewhere. And, were it possible to unite into one picture the varying and more distinctive patterns which the different groups of plants exhibit, the composite would be truly a picture such as one generally sees in sketches of tropical scenery. Truthfully, too, one may say that such pictures in Nature do exist, as, for example, in the deep valleys of the islands of Dominica or Martinique, where the cannas, the heliconias, the tree-ferns, bamboos, and palms are not only distinctive physiognomic types, but occur in such numbers and in such positions as to make the landscape conformably physiognomic. This is not the case with the forest of Guiana, where the types of vegetation that might be thought to be physiognomic in the broad characters which they present are so far overshadowed by the types that are not particularly distinctive that they lose themselves as determined or dominating figures in the landscape. The palm, for example, which perhaps most people would assume to be the one great distinctive feature of the vegetation of the tropics, is here completely lost, for its tufted crown does not generally rise to more than one-half the height of the great wall of the forest, and even in clumps it is frequently difficult to distinguish. The major part of the woodland, when not too closely scanned or when studied in mass, has an astonishingly northern aspect, the aspect of the woods which are familiar to us in the types of the locust, the laurel, beech, elm, and walnut. This broad resemblance has been clearly pointed out by Im Thurn in his work "Studies among the Indians of British Guiana," and doubtless has suggested itself to many other observers. When, however, a closer study is made of the components of tropical vegetation, when integrals are examined in place of aggregated masses, the resemblances to northern types, however strong they may yet appear, give way to differences that are far more pronounced in their appeal to the eye. It is in the interior of the forest that we learn to read the architecture of the vast structure that is about us—to approach with awe the giant buttressed trunks of the mora, the ceiba, the *Eriodendron*, or *Ficus*, to gaze with wondering delight upon the wealth of vegetation that in shrouds, in festooned lines and garlands, form the upper



Phot. A. Heilprin.

FIG. 2.—FOREST OF SECOND GROWTH ALONG THE DEMERARA RIVER.



Phot. A. Heilprin.

FIG. 3.—PULLING THROUGH THE RAPIDS OF THE ESEQUEIBO.

vegetal zone. It is no longer the land of the North, but the land where summer skies are a continuous day. The impressiveness of Nature is here at one with its glories, and man stands and contemplates in silence.

It may not be easy to take the full measure of beauty of a tropical forest; nor indeed, despite its extraordinary wealth of vegetable forms, need it command a higher or more satisfying degree of admiration than the sunlit leafy woods of the North. The forest of the South, rank in growth and illuminated by hardly more than flashes of sunlight, may be thought by many to be oppressive in its grandeur; it is forbidding rather than inviting, for there are no opening glades or vistas of moss-grown retreats, no soft carpets of grass or flowering banks, no receding lines of tree-trunks, to throw dimming shadows into the interior. Everything is grand and majestic, built on a plan to be awe-inspiring rather than pleasing, to evoke admiration rather than to delight.

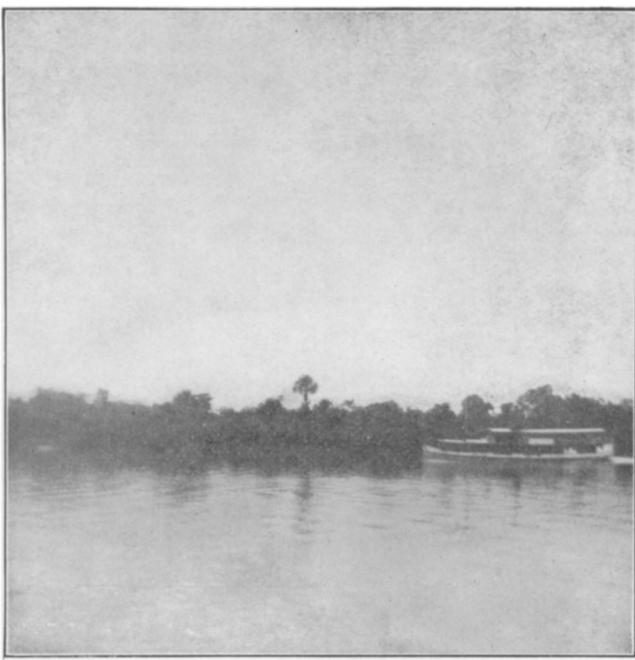
Mr. Wallace, in his illuminating writings upon "Tropical Nature," has laid emphasis, in a contrast between the forest of the South and that of the North—or, indeed, between the vegetation generally of the two sections of the globe—on the marked absence in the former of showy flowers, of that display which we recognize in the glory of a field of clover, or daisy and dandelion, and in the blossoming crowns of the apple, the pear, and the cherry. The traveller, he remarks, may wander for weeks among or about the wilds of the Amazonian solitudes without once having his attention attracted by showy flowers. The wilderness is green, severe, and unrelieved by colour. One cannot absolutely accept this picture, albeit it is framed by one whose years of observation in the equatorial regions entitle him to a degree of consideration which falls to the work of but few naturalists. Mr. Im Thurn, in the work already referred to, has taken distinct exception to Mr. Wallace's characterization, in so far as it relates to the water-front of the Guiana forest. A display of flowers is here by no means exceptional, and I question if there are many areas of northern woodland which have more, or even as much, to show. One cannot readily forget the patches of blue and purple *Passifloraceæ* which cover in sheets the outer tunic of the forest, the blazes of white and yellow acacias, or the intensely scarlet wheels of the *Rhexia*. These may not be more beautiful or attractive than the exquisite flowers of the rhododendron, the mountain-laurel or dog-wood, but are they much less? The northern woods, in fact, are not in themselves ordinarily prolific in a display of flowers. It is in the open fields and waste-

lands that we find that floral aggregation for which, I believe, one searches in vain in the tropics.

THE LIFE IN THE WILDERNESS.

It is, perhaps, a commonplace observation that life is prolific in the southern "bush." Yet, be it so or not, there are some who choose to believe that these wilds are impressive in their silence, by that hushed nature which is a part of the Polar tract. The deep forest interior may in places wear this character of desertion and loneliness, but elsewhere it plays true to the world which inhabits it, and resounds in joyous sounds and uproarious tumult. Let the stranger place himself on the borders of the forest at almost any point of the river and he may be certain sooner or later to become party to a woodland chorus for which he will have been but ill prepared. It is the voice of the red-howling monkey that he hears—perhaps that of a single individual, or it may be of a whole troop; but either way it is a voice of no gentle cadence—a roar that yields in little to that of the lion. The forest is seemingly in tumult, ringing with a desolating cry; but presently one hears only echoes, and for a while everything may be quiet. It was my ill-fortune not to see any of these monkeys, or, for that matter, any other form of monkey; although fairly abundant, and seemingly always prepared to lend their voices to the night, they managed to keep out of my way and sight. I am told, on what seems to be reliable authority, that on perfectly still nights the fracas caused by a single individual howler may at times be clearly heard at a distance of three or four miles, or even more.

Alexander von Humboldt, in his essay on the "Nocturnal Life of Animals," refers to the fitful roar of the American lion. I did not at any time hear this sound in the southern wilds, although acquainted with it in the North, nor did I once come upon the tracks of the animal. On our launch journey up the Essequibo we had occasion to notice a beautiful specimen of the black jaguar, or Maipuri tiger as it is here called, which was leisurely pacing a sand-pit that the river had thrown up. The animal had come out of the forest, and may have been following a trail of capybaras (*Water-haas*), several individuals of which had but a few moments before come down to the water's edge. This rodent seems to be the favourite food of the "tiger" in these parts. A large spotted cat, reported to be a jaguar but which may have been an ocelot, visited a mining clearing (where I was staying as a guest), back of the Omai, a few days later, but beyond causing a momentary



Phot. A. Heilprin.

FIG. 4.—ON THE LOWER DEMERARA RIVER.



Phot. A. Heilprin.

FIG. 5.—AI, OR THREE-TOED SLOTH, CLIMBING A LARGE FORESTER.

fright to a few negroes did no damage. The stock had been well guarded. My limited days in the woods did not permit me to become acquainted with more than a few of the animal forms that are represented to be most common in the region about. One of these was an individual of the three-toed sloth or *ái* (*Bradypus tridactylus*), which had wandered too close to a camp of dredge-builders, and was captured. It was most interesting to watch the antics of this animal. With a face more suggestive of an idiot than of anything else, and the bristling, shaggy coat wrapped about its awkwardly-moving limbs, it presented an aspect so singularly at variance with that of other mammals that one may easily pardon Waterton for having placed the figure of one on his frontispiece bearing the legend "A Nondescript." The animal made various efforts to secure his liberty by climbing up posts and tree-trunks, but he was taken away to be cared for in a neighbouring shack. His attempt to grapple a tree-trunk the dimensions of which were much too large for his enveloping arms was ludicrous in the extreme. As in other parts of the South American wilds, the leaves of the trumpet-tree or *Cecropia* constitute the sloth's principal food.

While the great forests of the North are largely deficient in bird-song, so much so that bird-life might be almost thought to be absent from them, this is in no wise true of the Guiana forest. The garrulous notes of the parrots and parroquets, the yelping calls of the toucan and aracari, sound from a far way in the lofty tree-tops, so far removed that one fails to recognize the brilliant colours with which these birds are adorned. Of exquisite tone are the resonant notes of the pee-pí-yó (*Lathria cineracea*), one of the numerous family of chatterers (*Ampelidae*). I do not recall a bird-note in any way comparable to that of this remarkable songster. Others are more musical, softer in cadence and melody, more brilliant in scale; but none has that emphasis of sound-volume, that metallic "parting of the ways," which distinguishes the pee-pí-yó. It is the most general note of the forest, just as the "*Qu'est-ce-que-dit?*" is the dominant note of the gardens and streets of the city. I was not fortunate enough to catch up the bell-notes of the white araponga or bell-bird (*Chasmorhynchus carunculatus* or *niveus*), which is said to be a common form in these wilds.

Somewhat toward the evening hour, but at times heard throughout the day, the extraordinary, metallic whirr of the six-o'clock-bee or razor-grinder cannot escape one. The insect flits from bush to bush and seemingly a machine-shop goes along.

It is a noteworthy fact that the insect pests are not noticeably

numerous in these forests—at least, they were not so in the parts that I visited. Recalling the account given by Humboldt of the torments that were inflicted by the myriads of mosquitoes along the Cassiquiare River, one could well be pardoned for fully preparing against like torments in the valleys of the Guiana rivers. But the mosquito was found to be almost wholly absent from both the Demerara and Essequibo rivers, and the minor insect plagues were about equally deficient, or, at least, not active. Presumably the large volume of swiftly-flowing waters was not favourable to the development of these plague-breeders, and the traveller was given to enjoy the beauties of Nature unmolested and unsought for blood-tribute. Even the great wasp or marabunta, whose home is more in the city than in the forest, gave no opportunity for complaint.

One of the most interesting facts connected with animal life that was called to my attention concerned a small bat, probably the *Desmodus rufus*, whose blood-sucking habits made caution necessary to both man and beast. I first came across this bat, which barely exceeded in size our own common *Vesperugo*, in the Demerara Exploration Company's clearing, about two miles from Omai Landing, on the Essequibo River. It was there a nightly and almost constant visitor to the mule paddock, and, when the opportunity permitted, it did not hesitate to attack the withers of the animals kept there, and draw their blood freely. So persistent were these attacks that it was found necessary, as a preventive to them, to have the paddock illuminated throughout the night with electric lights, the bright glare from which was seemingly taken unkindly by the little vampires. The quantity of blood actually drained by the bats themselves is small, but when the work of bleeding has been finished there is a free flow, the nature of the wound being such as to remain open for a long time. It seems to be a fact that the animals attacked are not for a long time made conscious of the assault, but in how far this unconsciousness is due to a pleasant, cooling sensation which it is thought the bat imparts to his victim through the movement of his membranes I am unable to say. Chickens and fowl of all kinds are liable to attacks similar to those which involve the larger stock, and man himself is by no means spared. A coloured boy who was working in the Omai clearing had been bitten in the large toe of one of his feet two or three days before my arrival, and he was still limping when I made an examination of his foot. He only knew of the incident on awaken-



Phot. A. Heilprin.

FIG. 6.—ERECTING A GOLD-DREDGE NEAR OMAI LANDING.



Phot. A. Heilprin.

FIG. 7.—A FOREST EXILE (PURPLEHEART).—185 FEET IN HEIGHT.

ing from sleep and discovering a big clot of blood in the hammock which he occupied.

THE EXPLOITATION OF THE INTERIOR.

With no interior roadways, its vast and virtually trackless forests, and the obstructing rapids that break the navigation of its waters, it is in the colony not considered a matter for surprise that it should be slow to open up its resources to the world, or that the inhabitants should barely know what these resources are. The almost boundless resource of timber, in both hard and dye woods, has thus far hardly been touched for export. Lumber concessions, under a wise forestry supervision, there are here and there, but little of the material felled finds its way beyond the limits of the colony. The most important specific grants are for *balata*, or rubber, forests of which extend across from the Barima to the Mazaruni; but little has been realized thus far from the grants. In its mineral aspects the colony shows a somewhat better record, but yet far from one that need offer a type to other countries. Ever since the days when Raleigh set out in search of the fabled El Dorado the quest for gold has been an occupation in Guiana, and what little this quest has yielded has been more than sufficient to demonstrate that gold mining may before a distant future become an important industry. Nearly all the gold is obtained from placer deposits, gravels, and clays, or from a complex rock of a granitic or diabasic character which liberates its product on decomposition. Until recently the work of mining was conducted on a rudimentary or losing system, but latterly considerable profits have been taken out from a few of the holdings where modern machinery has been introduced. Large pumping-engines, dredges, and stamps have already found their way into a few spots in the interior, and before long, doubtless, other locations will be similarly provided. Diamonds of an unusually clear water have been obtained from a few localities, but as yet little is known regarding their occurrence. Other valuable minerals, except the commoner kinds, have not heretofore been discovered. It is, however, only the exploration of the future which can give to us their full value.

Highways can and will be built into the interior, the rivers will be opened fully for navigation, and then the naturalist's paradise will gradually be converted into the prosaic commercial *Hinterland*. Until that time we may continue to wonder how it came to pass that a region so easily accessible, so prodigal in the fruits of Nature, should have so largely escaped the attention of the working naturalist.